

# HIV DRUG RESISTANCE REPORT 2017

TRENDS



QUALITY



ACTION







# **HIV DRUG RESISTANCE REPORT 2017**

HIV drug resistance report 2017

ISBN 978-92-4-151283-1

© World Health Organization 2017

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization..

**Suggested citation.** HIV drug resistance report 2017. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.

**Cataloguing-in-Publication (CIP) data.** CIP data are available at <http://apps.who.int/iris>.

**Sales, rights and licensing.** To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

**Third-party materials.** If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**General disclaimers.** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

The photographs in this material are used for illustrative purposes only; they do not imply any particular health status, attitudes, behaviors, or actions on the part of any person who appears in the photographs.

The mark "CDC" is owned by the US Dept. of Health and Human Services and is used with permission. Use of this logo is not an endorsement by HHS or CDC of any particular product, service, or enterprise.

Printed in Switzerland

# CONTENTS

<b>ABBREVIATIONS AND ACRONYMS</b> .....	v
<b>DEFINITIONS</b> .....	vi
<b>ACKNOWLEDGEMENTS</b> .....	vii
<b>EXECUTIVE SUMMARY</b> .....	viii
<b>1 INTRODUCTION</b> .....	01
1.1 Scope of report.....	01
1.2 Context: achieving the 90-90-90 targets by 2020 – the role of HIV drug resistance .....	01
1.3 Global HIV drug resistance surveillance .....	02
<b>2 HIV DRUG RESISTANCE IN POPULATIONS INITIATING ART: PRETREATMENT HIV DRUG RESISTANCE ..</b>	03
2.1 Nationally representative surveys of pretreatment HIV drug resistance among adult ART initiators, 2014–2017 ..	03
2.2 Nationally representative surveys of HIV drug resistance in children younger than 18 months of age, 2014–2017	17
2.3 Systematic literature review of pretreatment HIV drug resistance in adults in LMIC .....	18
2.4 Systematic literature review of pretreatment HIV drug resistance in children in LMIC .....	22
2.5 Pretreatment HIV drug resistance – summary of findings and implications .....	24
<b>3 HIV DRUG RESISTANCE IN POPULATIONS ON ART: ACQUIRED HIV DRUG RESISTANCE</b> .....	25
3.1 Nationally representative surveys of acquired HIV drug resistance, 2014–2017 .....	25
3.2 Systematic literature review of acquired HIV drug resistance in adults .....	35
3.3 Systematic literature review of acquired HIV drug resistance in children .....	38
3.4 Acquired HIV drug resistance – summary of findings and implications .....	40
<b>4 GLOBAL EFFORTS TO PREVENT, MONITOR AND RESPOND TO HIV DRUG RESISTANCE</b> .....	41
4.1 WHO Global Action Plan on HIV drug resistance, 2017–2021 .....	41
4.2 WHO Guidelines on the public health response to pretreatment HIV drug resistance .....	42

<b>5 SUSTAINABILITY OF HIV DRUG RESISTANCE SURVEILLANCE</b> .....	43
5.1 US-CDC support for HIV drug resistance surveillance .....	43
5.2 Global Fund support for HIV drug resistance surveillance .....	44
5.3 WHO support for HIV drug resistance surveillance .....	44
<b>6 CONCLUSIONS</b> .....	46
<b>REFERENCES</b> .....	47
<b>ANNEX</b> .....	51
Annex 1: Methodological notes .....	51
Section 1: WHO sequence data analysis and quality assurance for pretreatment HIV drug resistance surveys and acquired HIV drug resistance surveys .....	51
Section 2: Study design and methods for statistical analysis of pretreatment HIV drug resistance surveys and acquired HIV drug resistance surveys .....	51
Section 3: Adult pretreatment HIV drug resistance systematic literature review methods .....	54
Section 4: Paediatric pretreatment HIV drug resistance and acquired HIV drug resistance systematic literature review methods .....	65
Section 5: Adult acquired HIV drug resistance systematic literature review methods .....	66

# ACRONYMS AND ABBREVIATIONS

3TC	Lamivudine
ADR	Acquired HIV drug resistance
AMR	Antimicrobial resistance
ART	Antiretroviral therapy
ARV	Antiretroviral (drugs)
ATV/r	Atazanavir/ritonavir
CI	Confidence interval
DBS	Dried blood spot
DRM	Drug resistance mutation
DRV/r	Darunavir/ritonavir
DTG	Dolutegravir
EFV	Efavirenz
EID	Early infant diagnosis
EWI	Early warning indicator of HIV drug resistance
FTC	Emtricitabine
GAP	Global Action Plan on HIV drug resistance
Global Fund	The Global Fund to Fight AIDS, Tuberculosis and Malaria
HIVDR	HIV drug resistance
LMIC	Low- and middle-income countries
LPV/r	Lopinavir/ritonavir
NNRTI	Non-nucleoside reverse-transcriptase inhibitor
NRTI	Nucleoside reverse-transcriptase inhibitor
NVP	Nevirapine
PDR	Pre-treatment HIV drug resistance
PEP	Post-exposure prophylaxis
PEPFAR	United States President's Emergency Plan for AIDS Relief
PHIA	Population-based HIV Impact Assessment survey
PI	Protease inhibitor
PLHIV	People living with HIV
PMTCT	Prevention of mother-to-child transmission (of HIV)
PPPS	Probability proportional to proxy size
PPS	Probability proportional to size
PrEP	Pre-exposure prophylaxis
PR	Protease
RT	Reverse transcriptase
SDRM	Surveillance drug resistance mutation
TDF	Tenofovir disoproxil fumarate
TDR	Transmitted HIV drug resistance
UNAIDS	Joint United Nations Programme on HIV/AIDS
US-CDC	United States Centres for Disease Control and Prevention
VL	Viral load
WHO	World Health Organization
XTC	3TC or FTC
ZDV	Zidovudine

## DEFINITIONS

Operational definitions used in this report are presented below.

**HIV drug resistance (HIVDR)** is caused by a change (mutation) in the genetic structure of HIV that affects the ability of a particular drug or combination of drugs to block replication of the virus. All current antiretroviral (ARV) drugs, including newer classes, are at risk of becoming partially or fully inactive due to the emergence of drug-resistant virus. Broadly speaking, there are three main categories of HIVDR:

- 1. Acquired HIV drug resistance (ADR)** develops when HIV mutations emerge due to viral replication in individuals receiving ARV drugs.
- 2. Transmitted HIV drug resistance (TDR)** is detected in ARV drug-naive people with no history of ARV drug exposure. TDR occurs when previously uninfected individuals are infected with virus that has drug resistance mutations.
- 3. Pretreatment HIV drug resistance (PDR)** is detected in ARV drug-naive people initiating ART or people with prior ARV drug exposure initiating or reinitiating first-line ART. PDR is either transmitted or acquired drug resistance, or both. PDR may have been transmitted at the time of infection (i.e. TDR), or it may be acquired by virtue of prior ARV drug exposure (e.g. in women exposed to ARV drugs for the prevention of mother-to-child transmission of HIV, in people who have received pre-exposure prophylaxis, or in individuals reinitiating first-line ART after a period of treatment interruption without documented virological failure).

**ARV drug-naive** applies to people with no history of ARV drug exposure.

预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_26336](https://www.yunbaogao.cn/report/index/report?reportId=5_26336)

